Watershed Protection: A Project Focus
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Chapter 2: Watershed Projects — The Broad Issues

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Why is Watershed Planning the Right Thing to Do?

Watershed-based planning is not a new or exotic approach to water quality management. Some states and federal agencies (notably the Department of Interior and USDA) have sponsored watershed-based projects for many years, although water quality protection has not always been a primary goal of these projects. Watershed-based water quality management is the right thing to do because it protects, restores and maintains healthy ecosystems. It is an effective way to protect chemical water quality while at the same time protecting critical terrestrial and aquatic habitat, reducing soil erosion, and restoring aquatic communities. These benefits make the approach particularly useful for solving nonpoint source problems (or a combination of point and nonpoint problems); thus, it is applicable to the majority of the Nation's remaining water quality issues.

From a technical standpoint, watershed planning is grounded in an understanding of the full range of stressors in a watershed—physical, chemical, and biological—that may be affecting aquatic life and human health. When all significant sources and stressors are understood, agencies are better able to focus on those controls that are more likely to produce measurable improvements in ecosystem health.

Administratively, watershed planning is efficient. It encourages organizations to focus staff and financial resources on prioritized geographic locations and facilitates coordination and pooling of resources among interested parties. It also offers an opportunity for local agencies to take leadership roles in ecosystem protection.

Who are the "Stakeholders"?

Stakeholders are individuals and organizations that have an interest in identifying and solving water quality problems and in monitoring the effectiveness of these solutions over time. Stakeholders of a single watershed project could include:

Municipal and county governments

Local councils of government

Local soil and water conservation commissions or districts

County boards of commissioners

Individual citizens

Local and national citizen action groups

Local industries

Water suppliers

State surface and ground water agencies

State agricultural, fisheries, and natural resources agencies

Indian Tribes and communities

USDA agencies at the local level (NRCS, Agricultural Stabilization and Conservation Service, Forest Service)

Other Federal agencies (e.g., U.S. Fish and Wildlife Service, U.S. Geological Survey [USGS], Army Corps of Engineers)

EPA.

Local stakeholders are particularly important in targeting their local problems. They bring knowledge and concern for specific water bodies to the forefront. They serve as organizers in the area and keep interest alive and active. They are also effective in educating friends, neighbors, and local officials and putting action on the local, near-term agenda. Local interest and concern may, in fact, dictate which problems are dealt with first.

Why is Public Support So Necessary?

Experience has shown that the degree of public education and participation can determine the success of a watershed project. Without public support, projects may never get past the planning stage. Project implementation requires that local government and citizens have ownership of the project. For example, it can be impossible to implement best management practices (BMPs) for nonpoint source control without the support and cooperation of private land owners. In addition, a mid-course correction stage must be factored into the project. That is, the public needs to be prepared for the possibility that it may be necessary to alter or add additional point and nonpoint source management measures, if water quality goals are not being achieved part way through the project.

There are many ways to involve the public in watershed projects. For example, the formation of citizen review groups and technical committees has been shown to gain support from the diverse interests in a watershed and to provide an accessible core group of community leaders to keep the project going once agreements have finally been reached.

What is the Appropriate Scale for a Watershed Project under the Watershed Protection Approach?

One of the goals of the WPA is to produce a national set of watershed projects that illustrate the efficacy of the approach. The WPA does not mandate watershed size or scale. However, individual watershed projects should be larger than research or demonstration scale. Watersheds should be of sufficient size to achieve economies of scale, take advantage of local government and technical expertise, and be viable for long-term management (e.g., be at a scale that is feasible as more and more watershed projects develop around the state).

The following factors should be considered to determine an appropriate watershed size and set boundaries for watershed projects:

Nature and extent of the water quality problem

Existing administrative boundaries (e.g., counties)

National watershed delineations—e.g., USGS Cataloging Units, NRCS watersheds

Ecoregion boundaries—units reflecting homogeneous ecological systems, derived from analyses of such environmental factors as topography, land use, potential natural vegetation, and soils; the coterminous U.S. has 76 ecoregions (Omernik, 1986)

Water quality model limitations.

How are Watersheds Delineated?

Watersheds are delineated in a number of ways. Many states set watershed boundaries for planning purposes, and local governments or land management agencies may also delineate watersheds. Finally, concerned citizens or environmental groups may delineate a watershed of particular interest to them.

States—Several states have formally delineated their watersheds for planning purposes. Oklahoma has delineated approximately 300 watersheds, covering the entire State, for nonpoint source planning purposes. The Wisconsin Department of Natural Resources has delineated 330 watersheds for nonpoint source planning. The Ohio Environmental Protection Agency has divided the state into 93 “sub-basins” or component watersheds of roughly county size to match county-level water quality efforts by the NRCS and others. Within these sub-basins are approximately 1,000 watersheds at the level of fairly small streams.

North Carolina's Division of Environmental Management has delineated 17 river basins containing 135 sub-basin watersheds which average 250,000 acres in size. Figure 2-1 shows the sub-basins in the Tar-Pamlico River Basin. Currently, the basin is the unit for development of management plans on a 5-year, rotating cycle. The state is moving toward the targeting of controls on a sub-basin or watershed level; for example, in the Tar-Pamlico Basin, special data collection and modeling are under way by sub-basin to support point source/NPS source trading of nutrient loads.

Figure 2. The Tar-Pamlico River Basin, NC and its component watersheds

Figure 2-1. The Tar-Pamlico River Basin, NC and its component watersheds

Other agencies—Land management agencies such as NRCS, U.S. Fish and Wildlife Service, Bureau of Land Management, and National Park Service also delineate watersheds. For example, in Virginia, the NRCS has delineated approximately 500 "hydrologic units" averaging 53,000 acres in size for nonpoint source planning purposes. Boundaries are related loosely to prior Soil Conservation Service (now NRCS) watersheds and are subsets of USGS Cataloging Units. South Carolina has used NRCS Conservation Needs Inventory watersheds in delineating its 305(b) water bodies. The state contains approximately 320 NRCS watersheds.

Local government and citizens—Local governments, with the help of citizens, also delineate watersheds in order to mobilize resources and focus attention on particular

problems. In the Anacostia River Basin, Maryland, the District of Columbia, and local agencies have selected nine "priority sub-watersheds" for special management attention. For each, a sub-watershed action plan is prepared as a blueprint for restoration activities that are unique to the ecological needs of the area (see Restoration Accomplishments in Appendix A). In Virginia, the Chesapeake Bay Preservation Act authorizes the establishment of local boards that can identify watersheds as preservation areas. State agencies and programs can then be tapped to help local governments implement preservation plans.

How are Watersheds Ranked and Targeted?

Watersheds may be ranked and targeted for attention and action according to a number of criteria. These criteria may differ from state to state, local government to local government, and citizen group to citizen group. Most states use some type of formal process for prioritizing their water bodies or watersheds. The following criteria (adapted from Adler and Smolen, 1989) are especially appropriate to the example water body ranking/watershed targeting process depicted in Figure 2-2:

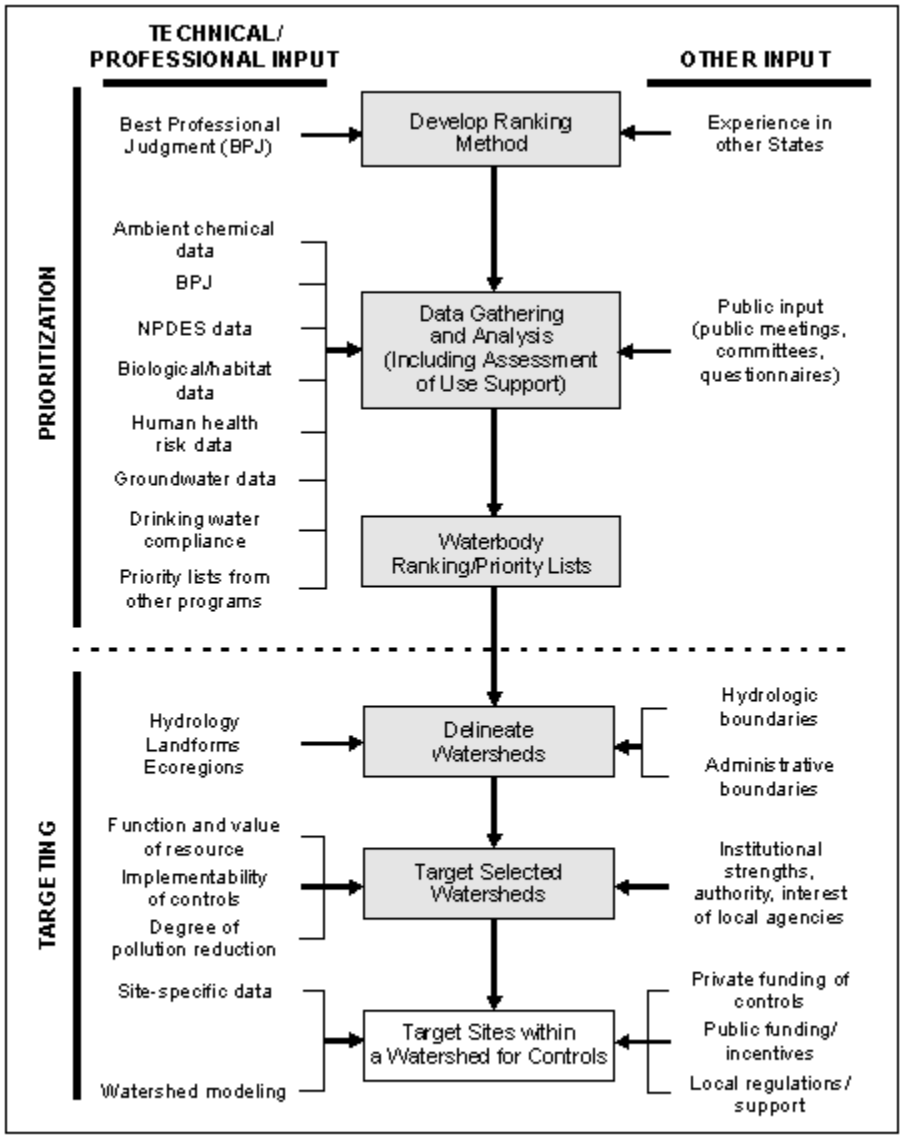
Severity or risk of impairment—Typically, the degree of impairment of designated uses as reported in state 305(b) reports or as determined through public input. This ranking criterion can ensure that waters most ecologically damaged, sensitive, or at risk get special consideration in the decision process.

Ecological value—This ranking criterion can ensure that waters of special ecological value get special consideration in the decision process. These waters might include cold water fisheries, primary nursery areas, and outstanding resource waters.

Resource value to the public—Many ranking systems assign high value to waters designated as public water supplies and recreational waters. This criterion ensures that waters most valued by the public or having the potential for public use receive consideration. Public support helps ensure funding and may indicate citizens' willingness to push for control efforts.

Data availability and quality—Rather than make water quality judgments based on insufficient information, some states establish minimum data requirements.

Figure 3. A water body ranking/watershed targeting process



Source: EPA, 1993a

Figure 2-2. A waterbody ranking/watershed targeting process.

Even watersheds that rank high according to the above criteria may not be the most suitable for intensive management efforts. A number of other factors are pertinent to targeting watersheds based on the ability to implement effective controls. These criteria include:

Resolvability of the problem—ability of existing management tools (e.g., BMPs) to solve the water quality problem expeditiously

Institutional feasibility—whether institutional arrangements are sufficient to put these tools in place (e.g., local governments have authority to pass needed ordinances)

Legal mandates—court-ordered TMDLs, for example, may propel watersheds to the top of statewide priority lists

State financial and human resources—availability of state resources for multiple watershed projects while still meeting regulatory obligations

Local financial and human resources—availability of funding or skilled personnel from various agencies. These resources may take the form of technical and management expertise or payments for controls to carry out a watershed management plan.

For further information on ranking and targeting approaches, see *Geographic Targeting: Selected State Examples* (EPA, 1993a).

Is Watershed Planning Suitable where Ground Water Contamination is a Major Concern?

Ground water concerns are important in nonpoint source watershed projects around the country. The Clean Water Act discourages nonpoint source controls that protect surface waters at the expense of ground water. Watershed projects can be a good mechanism for taking into account all possible impacts on surface and ground water resources.

In some areas, ground water/surface water interactions are highly complex and may alter or preclude the delineation of watershed boundaries. For example, in karstland (limestone and dolomite terrain with sinkholes, subsurface streams, and caverns), ground water may discharge well beyond apparent watershed boundaries that are based on topography. Point source or nonpoint source controls that change surface water quality in one area may actually have greater impact on the ground water and surface water of areas quite a distance away. Similarly, glaciated areas in the Northern United States and highly arid areas in the Southwest can have complex surface/ground water hydrology.

In such areas, agencies should carefully consider whether planning units should be watersheds (perhaps large watersheds) or administrative units such as counties or regions. In some cases, a dual approach with separate surface and subsurface water resource delineations may be appropriate. Surface/ground water interactions should be understood and factored into all aspects of a watershed project.

How do We Measure the Success of a Watershed Project?

It is not always easy to document or measure the success of a watershed project. Watersheds are dynamic systems that require years to restore equilibrium after controls are implemented, and monitoring for environmental success is technically difficult and resource intensive. Nonetheless, we want to know if water quality has improved or if fish populations have grown in abundance or diversity in a relatively short time period. Recognition of the time involved in measuring success is as important as determining what conditions will represent success. Fortunately, some institutional and programmatic measures of success require less time to show results than direct environmental measures. For example, tracking the number of stream miles monitored, the number of facilities installing BMPs, or the number of municipalities enacting zoning ordinances can indicate short-term progress toward long-term goals. Chapter 6 of this document discusses goals and environmental indicators for watershed projects.